



PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

EX PARTE MIKHAYLICHENKO ET AL.

Application for Patent

Filed March 31, 2004

Application No. 10/816,487

FOR:

PROXIMITY HEAD HEATING METHOD AND APPARATUS

AMENDED APPEAL BRIEF

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I. REAL PARTY IN INTEREST

The real party in interest is Lam Research, Inc., the assignee of the present application.

II. RELATED APPEALS AND INTERFERENCES

The Applicants are not aware of any related appeals or interferences.

III. STATUS OF CLAIMS

A total of 21 claims were presented during prosecution of this application. Claims 1-9 were canceled in response to a Restriction Requirement as being drawn to a non-elected invention. Claims 10-21 are rejected. The Applicants appeal rejected claims 10-21.

IV. STATUS OF AMENDMENTS

There were no substantive claim amendments filed after the final office action of June 12, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 10 discloses a proximity head (Fig. 1A item 110 and paragraph 24 et seq.) for semiconductor wafer processing, comprising: a heating portion (Fig. 1A item 190 and paragraph 25 et seq.) configured to control a temperature of a liquid flowing therethrough; a sensor (Fig. 1D item 185 and paragraph 34 et seq.) disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion; a channel (paragraph 44 et seq. and Figs. 5-6 items 520, 620 and paragraphs 45-49) disposed in the heating portion, the channel being configured to guide the liquid through the heating portion (paragraph 44 et seq.); and a bottom surface (Figs. 1A-3 and

paragraph 25 et seq.) having a plurality of outlet ports (Fig. 1A, item 192 and paragraph 27 et seq.) and a plurality of vacuum inlet ports (Fig. 1A, item 194 and paragraph 27 et seq.), the plurality of outlet ports being in fluid communication with the channel disposed in the heating portion, and the plurality of outlet ports and the plurality of vacuum inlet ports opening to a liquid meniscus (Fig. 2, item 210, paragraph 39) supported between the bottom surface of the proximity head and a surface (Fig. 1A-3, item 150 and paragraphs 24-49) of a semiconductor wafer, wherein the plurality of vacuum inlet ports surrounds the plurality of outlet ports (Fig. 1A, items 192 and 194 and paragraph 27 et seq.).

Independent claim 17 discloses a semiconductor wafer processing system, comprising: a liquid source; a proximity head (Fig. 1A item 110 and paragraph 24 et seq.) in fluid communication with the liquid source (Fig. 1A item 120 and paragraph 24 et seq.), the proximity head including: a heating portion (Fig. 1A item 190 and paragraph 25 et seq.) configured to control a temperature of a liquid flowing therethrough, a sensor (Fig. 1D item 185 and paragraph 34 et seq.) disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion, a channel (paragraph 44 et seq. and Figs. 5-6 items 520, 620 and paragraphs 45-49) disposed in the heating portion, the channel being configured to guide the liquid through the heating portion (paragraph 44 et seq.), and a bottom surface (Figs. 1A-3 and paragraph 25 et seq.) having a plurality of outlet ports (Fig. 1A, item 192 and paragraph 27 et seq.) and a plurality of vacuum inlet ports (Fig. 1A, item 194 and paragraph 27 et seq.), the plurality of outlet ports being in fluid communication with the channel disposed in the heating portion, and the plurality of outlet ports and the plurality of vacuum inlet ports opening to a liquid meniscus (Fig. 2, item 210, paragraph 39) supported between the bottom surface of the proximity head and a surface (Fig. 1A-3, item 150 and paragraphs 24-49) of a semiconductor wafer, wherein the plurality of vacuum inlet ports surrounds the plurality of outlet ports (Fig. 1A, items 192

and 194 and paragraph 27 et seq.); a first member coupled to the proximity head, the first member being configured to manipulate the proximity head (Fig. 7A, item 720 and paragraph 50 et seq.); and a second member (Fig. 2, item 140 and paragraph 25 et seq.) configured to support a wafer (Figs. 1A-4, 7A-7C, item 150 and paragraph 25 et seq.), the second member being capable of placing the semiconductor wafer proximate to the bottom surface of the proximity head.

It should be appreciated that the above discussion represents only a summary of the present invention. A more in-depth discussion of the present invention is provided in the Detailed Description section of the application.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 10-21 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

B. Claims 10, 16, 17 and 21 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 15-20 of co-pending Application No. 11/061,944 held to *Yun* in view of *Yuji* (JP 2001-220688) and *de Larios* (US Pat 6,488,040) and *Balance* (US Pat 6,090,210).

C. Claims 11-14, 18 and 19 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 15-20 of co-pending Application No. 11/061,944 held to *Yun* in view of *Yuji* and *de Larios* and *Balance* as applied to claims 10, 16 and 17 above and in further view of *Kawamura* (US Pat 5,696,348).

D. Claims 15 and 20 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 15-20 of co-pending

Application No. 11/061,944 held to *Yun* in view of *Yuji* and *de Larios* and *Balance* and *Kenji* (JP 08-277486).

E. Claims 10 and 16 were rejected under 35 U.S.C. 103(a) as being obvious over *de Larios* in view of *Yuji* and *Balance*.

F. Claims 11-14 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Yun* or *de Larios* in view of *Yuji* and *Balance* as applied to claims 10 and 16 above, in view of *Kawamura*.

G. Claims 15, 17, 20 and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over *de Larios* in view of *Yuji* and *Balance* as applied in claims 10 and 16 above and further in view of *Kenji*.

VII. ARGUMENT

A. **Rejections of claims 10-21 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The Office has asserted that claims 10-21 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically with regard to claim 10, that claim 10 recites the limitation “the channel” in lines 6 and 10. Claim 10 provides, in pertinent part:

“10. A proximity head for semiconductor wafer processing, comprising:
a heating portion configured to control a temperature of a liquid flowing therethrough;
a sensor disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion;
a channel disposed in the heating portion, the channel being configured to guide the liquid through the heating portion; and...” (emphasis added)

Applicant asserts the antecedent basis for “the channel” in lines 6 and 10 of claim 10 are provided by the term “a channel” that begins line 5 of claim 10.

Specifically with regard to claim 15, that claim 15 recites the limitations “the first channel” and “the second channel” in lines 3 and 4. Claim 15 provides:

“15. The proximity head of claim 10, wherein the channel in the heating portion is a first channel and the heating portion *further includes a second channel*, wherein the first channel and the second channel are separated by a material having sufficient thermal conductivity so that heat from a circulating liquid in the second channel can be exchanged with the liquid in the first channel.” (emphasis added)

Applicant asserts the antecedent basis for “the first channel” and “the second channel” in lines 3 and 4 of claim 15 are provided by the term “a first channel” and “a second channel” on lines 1 and 2 of claim 15.

Therefore, the Applicants submit that each of claims 10-21 is definite and in compliance with the requirements of 35 U.S.C. 112. Applicant respectfully requests the Board overturn the Examiner’s rejections of claims 10-21 under 35 U.S.C. 112.

B. Rejection of claims 10, 16, 17 and 21 which stand *provisionally* rejected on the ground of non-statutory obviousness-type double patenting.

Claims 10, 16, 17 and 21 were *provisionally* rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 15-20 of co-pending Application No. 11/061,944 held to *Yun* in view of *Yuji* (JP 2001-220688) and *de Larios* (US Pat 6,488,040) and *Balance* (US Pat 6,090,210). As this rejection is *provisional*, Applicant requests the Board hold this rejection in abeyance.

C. Rejection of claims 11-14, 18 and 19 which stand *provisionally* rejected on the ground of non-statutory obviousness-type double patenting.

Claims 11-14, 18 and 19 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 15-20 of co-pending

Application No. 11/061,944 held to *Yun* in view of *Yuji* and *de Larios* and *Balance* as applied to claims 10, 16 and 17 above and in further view of *Kawamura* (US Pat 5,696,348). As this rejection is *provisional*, Applicant requests the Board hold this rejection in abeyance.

D. rejection of claims 15 and 20 which stand *provisionally* rejected on the ground of non-statutory obviousness-type double patenting.

Claims 15 and 20 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 15-20 of co-pending Application No. 11/061,944 held to *Yun* in view of *Yuji* and *de Larios* and *Balance* and *Kenji* (JP 08-277486). As this rejection is *provisional*, Applicant requests the Board hold this rejection in abeyance.

E. Rejection of claims 10 and 16 were rejected under 35 U.S.C. 103(a) as being obvious over *de Larios* in view of *Yuji* and *Balance*.

Applicant submits this rejection is incorrect as the cited combination of *de Larios* and *Yuji* and *Balance* does not teach or suggest each and every limitation of Applicant's invention claimed in independent claim 10 and claim 16 which depends therefrom.

Claim 10 recites "A proximity head for semiconductor wafer processing, comprising: a heating portion configured to control a temperature of a liquid flowing therethrough; a sensor disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion; a channel disposed in the heating portion, the channel being configured to guide the liquid through the heating portion; and a bottom surface having a plurality of outlet ports and a plurality of vacuum inlet ports, the plurality of outlet ports being in fluid communication with the channel disposed in the heating portion, and the plurality of outlet ports and the plurality of vacuum inlet ports opening to a liquid meniscus supported between the bottom surface of the proximity head

and a surface of a semiconductor wafer, wherein the plurality of vacuum inlet ports surrounds the plurality of outlet ports.”

Claim 16 recites: “The proximity head of claim 10, wherein the sensor is coupled to a controller, the controller being configured to control the temperature of the liquid in the heating portion.”

The *de Larios* reference discloses a capillary proximity head for single wafer cleaning and drying. At column 6, lines 8-33, *de Larios* states:

“FIG. 4 shows a magnified cross-sectional view of a proximity head 102a in accordance with one embodiment of the present invention. In this embodiment, a *plurality of source inlets 106 and a plurality of source outlets 104 are interspersed throughout the proximity head 102a*. Each of the plurality of source inlets 106 and each of the plurality of source outlets 104 are long but thin capillary tubes. The *tubes including the plurality of source outlets 104 are small in diameter and allow capillary action* (such as, for example, capillary attraction) to take place when located in a position close to the surface of the wafer 108. There, fluid on the surface of the wafer 108 is attracted to the inside surface of the each of the plurality of source outlets 104. Consequently, the fluid moves into the plurality of source outlets 104 by capillary action. With the addition of clean *gas pressure or liquid pressure induced by the plurality of source inlets 106 and suction pressure through the plurality of source outlets 104, fluid on the surface of the wafer is easily and efficiently evacuated* while extensively reducing droplet formation on the wafer surface. *In one embodiment, there are about 2 million capillary tubes dispersed throughout the proximity head 102a that is configured to process 300 mm wafers*. It should be understood that any number of capillary tubes may be used in the proximity head 102a as long as liquid can be evacuated off of the surface of the wafer 108 while reducing droplet formation.” [Emphasis and underlining added.]

As set forth above, *de Larios* shows “up to about 2 million” source inlets 106 and source outlets 104 that are *interspersed throughout de Larios’ proximity head 102a*. Thus, Applicant submits that *de Larios* does not teach any particular arrangement of the inlet ports and outlet ports in the surface of the proximity head. Further, *de Larios’* source outlets are very small in diameter and provided the required *capillary action* to remove the liquid from the meniscus.

In contrast, Applicant’s claim 10 specifies that the bottom surface of the proximity head has a plurality of outlet ports and a plurality of vacuum inlet ports, and that the plurality of vacuum inlet ports surrounds the plurality of outlet ports.

de Larios does not disclose or suggest the specific configuration of source outlet ports and source inlet ports as specified in Applicant's claim 10. Further, if *de Larios*' proximity head is a 300mm circle so as to be able to process an entire surface of a 300 mm wafer at once, then it would have an area equal to $\pi * r * r = \pi * 150\text{mm} * 150\text{mm} = 70685.8 \text{ mm square}$. Further, with 2 million source inlets and source outlets interspersed over the 70685.8 mm square area of yields approximately **28 source inlets and source outlets are interspersed on each square millimeter**. A square millimeter is about the same size as this quoted letter M: "M". *de Larios*' interspersed source inlets and source outlets must be small enough in diameter to fit 28 of them within this quoted letter M: "M". Further, *de Larios*' proximity head is not necessarily limited to being a 300mm circle but could be a significantly smaller size than the 300 mm wafers that are processed. That would further reduce the size and how densely packing of *de Larios*' interspersed source inlets and source outlets. Further, *de Larios*' proximity head uses the interspersed nature of the source inlets and the source outlets so that "gas pressure or liquid pressure induced by the plurality of source inlets 106 and suction pressure through the plurality of source outlets 104, fluid on the surface of the wafer is easily and efficiently evacuated" where "the suction pressure" is a result of the capillary action of the source outlets 104.

The Examiner relies on *Yuji* to teach a temperature sensor, specifically a thermocouple, in a spray nozzle. *Yuji*'s nozzle is intended to spray liquid. *Yuji*'s system allows monitoring of the temperature of the liquid passing through the spray nozzle. *Yuji*'s nozzle is not the same as nor similar nor suggestive of Applicant's proximity head. Therefore Applicant asserts that nothing in the *Yuji* reference cures the above-discussed deficiencies of the *de Larios* reference relative to the configuration of the proximity head specified in amended claim 10. Thus, even if the *de Larios* and *Yuji* references were to be combined in the manner proposed by the Examiner, the result would not have been a

proximity head having the features specified in amended claim 10. Thus, the combination of *de Larios* in view of *Yuji* does not raise a *prima facie* case of obviousness against the subject matter defined in amended claim 10.

Examiner asserts *Balance* teaches a heating portion in the showerhead wherein tubes are provided between lamps in the heating portion to provide heat transfer (cooling). *Balance's* showerhead is not the same as nor suggestive of Applicant's proximity head. Nothing in the *Balance* reference cures the above-discussed deficiencies of the *de Larios* and *Yuji* references relative to the configuration of the proximity head specified in amended claim 10. Thus, even if the *de Larios* and *Yuji* and *Balance* references were to be combined in the manner proposed by the Examiner, the result would not have been a proximity head having the features specified in amended claim 10.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). For at least the reasons discussed above, the Applicants submit that the combination of *de Larios* in view of *Yuji* and *Balance* fail to teach or suggest each and every feature of claim 10, and that the combination of *de Larios* in view of *Yuji* and *Balance* does not raise a *prima facie* case of obviousness against the subject matter defined in amended claim 10. Accordingly, Applicant submits that claim 10, is patentable under 35 U.S.C. § 103(a) over the combination of *de Larios* in view of *Yuji* and *Balance*. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claim 10 under 35 U.S.C. 103.

Regarding claim 16: Because a dependent claim includes each and every feature of its independent claim, the dependent claim is patentable for at least the same reasons as its

independent claim. Therefore, the Applicants submit that dependent claim 16 is patentable for at least the same reasons provided for independent claim 10. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claim 16 under 35 U.S.C. 103.

F. Rejection of claims 11-14 under 35 U.S.C. 103(a) as being unpatentable over *Yun* or *de Larios* in view of *Yuji* and *Balance* as applied to claims 10 and 16 above, in view of *Kawamura*.

Applicant submits this rejection is incorrect as the cited combination of *Yun* or *de Larios*, *Yuji*, *Balance* and *Kawamura* does not teach or suggest each and every limitation of Applicant's invention claimed in claims 11-14 which depend from claim 10.

The *Yun et al.* reference, which was published on June 15, 2006, qualifies as prior art against the subject application under 35 U.S.C. § 102(e) because it is a continuation-in-part of a prior application, which was filed on September 30, 2002. As set forth in 35 U.S.C. § 103(c), subject matter that qualifies as prior art only under 35 U.S.C. § 102(e) does not preclude patentability under section 103 "where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person." In the present situation, both the *Yun et al.* reference and the subject application are owned by Lam Research Corporation. Further, at the time the claimed subject matter was made, the inventors were under an obligation to assign the claimed subject matter to Lam Research Corporation. In this regard, Applicants' undersigned representative notes that an assignment from the inventors to Lam Research Corporation was concurrently submitted with the subject application on March 31, 2004. Thus, pursuant to 35 U.S.C. § 103(c), the *Yun et al.* reference is not available as section 103 prior art against the subject application.

Accordingly, Applicants respectfully submit that the rejection of claims 11-14 under 35 U.S.C. § 103(a) as being unpatentable over *Yun* alone or in any combination with

any other cited reference is improper. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claims 11-14 under 35 U.S.C. 103.

Regarding the *Kawamura* reference, the Examiner asserts *Kawamura* teaches a thermocouple constructed of a protective pipe made of SiC. *Kawamura's* thermocouple is not the same as nor suggestive of Applicant's proximity head which is claimed in claim 10 and which claims 11-14 depend. Because a dependent claim includes each and every feature of its independent claim, the dependent claim is patentable for at least the same reasons as its independent claim. Therefore, the Applicants submit that each of dependent claims 11-14 is patentable for at least the same reasons provided for its independent claim. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claims 11-14 under 35 U.S.C. 103.

G. Rejection of claims 15, 17, 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over *de Larios* in view of *Yuji* and *Balance* as applied in claims 10 and 16 above and further in view of *Kenji*.

Applicant submits this rejection is incorrect as the cited combination of *Yun* or *de Larios*, *Yuji*, *Balance* and *Kawamura* does not teach or suggest each and every limitation of Applicant's invention claimed in claim 15 which depends from claim 10. Applicant submits this rejection is incorrect as the cited combination of *Yun* or *de Larios*, *Yuji*, *Balance* and *Kawamura* does not teach or suggest each and every limitation of Applicant's invention claimed in claims 17, 20 and 21 as set forth below.

Regarding claim 15 and because a dependent claim includes each and every feature of its independent claim, the dependent claim is patentable for at least the same reasons as its independent claim. Therefore, the Applicants submit that claim 15 is patentable for at least the same reasons provided for independent claim 10. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claim 15 under 35 U.S.C. 103.

Regarding claim 17 which recites “A semiconductor wafer processing system, comprising: a liquid source; a proximity head in fluid communication with the liquid source, the proximity head including: a heating portion configured to control a temperature of a liquid flowing therethrough, a sensor disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion, a channel disposed in the heating portion, the channel being configured to guide the liquid through the heating portion, and a bottom surface having a plurality of outlet ports and a plurality of vacuum inlet ports, the plurality of outlet ports being in fluid communication with the channel disposed in the heating portion, and the plurality of outlet ports and the plurality of vacuum inlet ports opening to a liquid meniscus supported between the bottom surface of the proximity head and a surface of a semiconductor wafer, wherein the plurality of vacuum inlet ports surrounds the plurality of outlet ports; a first member coupled to the proximity head, the first member being configured to manipulate the proximity head; and a second member configured to support a wafer, the second member being capable of placing the semiconductor wafer proximate to the bottom surface of the proximity head.”

The above-discussed deficiencies of the *de Larios* and *Yuji* references relative to the subject matter defined in claim 10 also apply to the subject matter defined in claim 17.

The Examiner asserts the *Kenji* reference teaches a plating device with heaters. *Kenji's* plating device is not the same as nor suggestive of Applicant proximity head as claimed in claim 17. Therefore, Applicant submits the *Kenji* reference does not cure the deficiencies of the *de Larios* and *Yuji* references relative to the subject matter defined in claim 17. Thus, the combination of the *de Larios*, *Yuji*, and *Kenji* references does not raise a *prima facie* case of obviousness against the subject matter defined in amended claim 17.


To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180

USPQ 580 (CCPA 1974). Furthermore, "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). For at least the reasons discussed above, the Applicants submit that the combination of *de Larios* in view of *Yuji* and *Kenji* fail to teach or suggest each and every feature of claim 17 and that the combination of *de Larios* in view of *Yuji* and *Kenji* does not raise a *prima facie* case of obviousness against the subject matter defined in amended claim 17. Accordingly, Applicant submits that claim 17, is patentable under 35 U.S.C. § 103(a) over the combination of *de Larios* in view of *Yuji* and *Kenji*. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claim 17 under 35 U.S.C. 103.

Turning to claims 20 and 21, and because a dependent claim includes each and every feature of its independent claim, Applicants submit the dependent claims 20 and 21 are patentable for at least the same reasons as independent claim 17. Therefore, the Applicants respectfully request the Board to overturn the Examiner's rejection of claims 20 and 21 under 35 U.S.C. 103.

In view of the foregoing, the Applicants submit that each of rejected claims 10-21 is patentable. Therefore, the Applicants respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner's rejections of the claims on appeal.

Respectfully Submitted,
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VIII. CLAIMS APPENDIX

1-9 (Canceled).

10. A proximity head for semiconductor wafer processing, comprising:

a heating portion configured to control a temperature of a liquid flowing therethrough;

a sensor disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion;

a channel disposed in the heating portion, the channel being configured to guide the liquid through the heating portion; and

a bottom surface having a plurality of outlet ~~port~~ ports and a plurality of vacuum inlet ports, the plurality of outlet ports being in fluid communication with the channel disposed in the heating portion, and the plurality of outlet ports and the the plurality of vacuum inlet ports opening to a liquid meniscus supported between the bottom surface of the proximity head and a surface of a semiconductor wafer, wherein the plurality of vacuum inlet ports surrounds the plurality of outlet ports.

11. The proximity head of claim 10, wherein the heating portion is comprised of silicon carbide and is coupled to a power source.

12. The proximity head of claim 10, wherein the heating portion is comprised of an insulating material having an electrically conductive material dispersed therein, the electrically conductive material being coupled to a power source.

13. The proximity head of claim 12, wherein the insulating material is comprised of a ceramic material.

14. The proximity head of claim 12, wherein the electrically conductive material comprises a wire.

15. The proximity head of claim 10, wherein the channel in the heating portion is a first channel and the heating portion further includes a second channel, wherein the first channel and the second channel are separated by a material having sufficient thermal conductivity so that heat from a circulating liquid in the second channel can be exchanged with the liquid in the first channel.

16. The proximity head of claim 10, wherein the sensor is coupled to a controller, the controller being configured to control the temperature of the liquid in the heating portion.

17. A semiconductor wafer processing system, comprising:
a liquid source;
a proximity head in fluid communication with the liquid source, the proximity head including:

a heating portion configured to control a temperature of a liquid flowing therethrough,

a sensor disposed within the proximity head for measuring the temperature of the liquid flowing through the heating portion,

a channel disposed in the heating portion, the channel being configured to guide the liquid through the heating portion, and

a bottom surface having a plurality of outlet ports and a plurality of vacuum inlet ports, the plurality of outlet ports being in fluid communication with the channel disposed in the heating portion, and the plurality of outlet ports and the plurality of vacuum inlet ports opening to a liquid meniscus supported between the bottom surface of the proximity head and a surface of a semiconductor wafer, wherein the plurality of vacuum inlet ports surrounds the plurality of outlet ports; a first member coupled to the proximity head, the first member being configured to manipulate the proximity head; and

a second member configured to support a wafer, the second member being capable of placing the semiconductor wafer proximate to the bottom surface of the proximity head.

18. The semiconductor wafer processing system of claim 17, wherein the heating portion is comprised of silicon carbide and is coupled to a power source.

19. The semiconductor wafer processing system of claim 17, wherein the heating portion is comprised of an insulating material having an electrically conductive material dispersed therein, the electrically conductive material being coupled to a power source.

20. The semiconductor wafer processing system of claim 17, wherein the channel in the heating portion is a first channel and the heating portion further includes a second channel, wherein the first channel and the second channel are separated by a material having sufficient thermal conductivity so that heat from a circulating liquid in the second channel can be exchanged with the liquid in the first channel.

21. The semiconductor wafer processing system of claim 17, wherein the sensor is coupled to a controller, the controller being configured to control the temperature of the liquid in the heating portion.

IX. EVIDENCE APPENDIX

There is no evidence exhibits relied on for the grounds of appeal.

X. RELATED PROCEEDINGS APPENDIX

There are currently no decisions rendered by a court or the Board in any proceeding identified in the Related Appeals and Interferences section.